Hull

Remarks of Dr. James C. Fletcher, NASA, Administrator
World Aerospace Conference
San Francisco, CA
October 15, 1974

INTRODUCTION

Within the past six weeks I have visited Europe, the Soviet Union and Japan. I have talked with the leaders of space programs and toured space facilities in all three regions. I am, therefore, more than ever aware of the capabilities, achievements and planning of national space programs abroad. And I am more immediately aware of the prospects for cooperation among these three great centers and between them and the United States.

From my point of view, then, it is particularly timely for me to talk with you about NASA's experience in international space projects. And I'm pleased indeed to be here with you for that purpose.

THE BASIS FOR COOPERATION

Like any other enterprise, international cooperation in space must be built on a firm foundation. The building blocks of space cooperation are the national programs which attract skilled personnel and develop the capabilities required for joint projects. Without strong national efforts, we could not generate projects that would be meaningful for all the participants.

This is not to say that the capabilities must be equivalent at the outset. Small centers of scientific competence abroad may be, and indeed have been, sufficient to generate collaborative experiments. The increased capabilities brought into being in this way can contribute to more advanced projects. Still, the outlook for important joint enterprises in space is inevitably fixed in large part by the level of development in the major space centers of the world.

What is the comparative readiness for important collaboration -- technically and politically? In the United States, of course, we think that readiness is high. We are conducting a broadly balanced civilian space effort at a fairly stable budgetary level. Our programs encompass near-earth science, planetary investigations, solar and stellar astronomy, the full gamut of practical applications -- especially in meteorology and earth resources surveying -- and manned flight. We have consistently obtained from our Administration and Congress a support level of somewhat in excess of $3 billion per year.

In political terms, the United States has given an emphasis to cooperation in space which may be unprecedented in any field of advanced technology. The Congress specified international cooperation as one of the prime objectives of the National Aeronautics and Space Act of 1958. Every chief executive since

President Eisenhower has publicly advocated such cooperation, and the subject has been an important item even at the Summit. I will leave to later what we have done to give practical expression to this political goal; as many of you know, it has been substantial.

What of our partners and prospective partners?

Europe's budgeting for national and regional space activities has grown to roughly a sixth of ours, partly because we have retrenched very substantially since our high point in the mid-sixties and partly because of increased European funding, especially in France and West Germany. That funding is now relatively narrowly directed to practical applications. Only the funding for Spacelab is relevant to manned flight and there is comparatively little new money going into space science. Europe has given more and more emphasis to regional programming with the result that the major instrument for cooperation, both within Europe and between Europe and other centers, will clearly be ESRO and its successor, the European Space Agency. The willingness of all but one of ESRO's ten members to enter into the Spacelab agreement with NASA certainly appears to signify a high level of political readiness to engage in important cooperation.

It should be noted that Europe is making a second major effort to develop an independent launch capability in the L3S, or Ariane. Some interpret this as a signal that Europe means ultimately to go its own way rather than to collaborate on a broad scale with the United States, as in the past. I don't myself think that Ariane represents an either/or proposition. I would expect that the advent of the Shuttle and Spacelab in the United States will actually increase the opportunities for US-European cooperation in view of the substantial launch and payload economies which should be possible and which will not be within the capabilities of conventional vehicles.

Given Europe's level of funding and the conscious direction of its space interest, it would appear that future collaboration may find its most important expression in the applications field -- and this has already begun to manifest itself with Intelsat and now Aerosat.

Turning to the Soviet Union, we have some difficulty in characterizing that nation's space program since we lack the necessary information on a majority of their near-earth missions. Nor is it easy to estimate the funding level devoted to space there. Nevertheless, it is clear that we see the most active space program in the world today, with an annual launch rate running at three

times our own. The Soviet planetary program has been considerably more active -- but probably not more fruitful -- than our own. Their manned flight program has lately resumed a high level of activity during the period of U. S. development of the Space Shuttle. And we see some sustaining activity in both space science and applications, but probably not as great as our own.

While the record of collaborative activity by the Soviet Union does not approach either our own or Europe's, there has been active cooperation with France, India, and the United States and apparently some participation by the Eastern European Bloc. We are probably safe in concluding that the Soviet Union is increasingly, even if slowly so, ready to consider collaboration in space and that it has a formidable national base for such collaboration.

In the case of Japan, the space effort is the newest and smallest among the regional centers we are discussing. The annual budget is more comparable to those of France and West Germany, about $200M/year, but it is expended principally on the development of a launch vehicle based on the U. S. Thor-Delta. The remainder is almost entirely directed at the present time to communications and meteorology. The three major satellites involved are being contracted for in the United States. While

Japan has orbited several small satellites of her own. these have been largely launch-test oriented. Thus, Japan's specific space experience for addressing major international space projects is considerably more limited than that of the other three centers. In terms of posture, Japan has so far preferred the commercial rather than the cooperative route to space activity. Whether this might change is hard to say.

This brief run-down of comparative space anatomies gives us the framework within which international space activity, current and future, can be realistically considered.

HOW SPACE COOPERATION STANDS TODAY

It should come as no surprise, in light of this overview, that our principal collaborator in space to date has been Europe, collectively and individually. The long series of cooperative satellite projects we have undertaken with the U.K., France, Italy, Germany, The Netherlands, Spain and the European Space Research Organization is about to reach its apex with the December launch of Helios, the first of two probes designed to fly nearer to the sun than any predecessors, closer than the planet Mercury.

As is the usual pattern in these programs, the two Helios spacecraft were proposed, designed, funded, constructed and largely instrumented in the collaborating country -- in this case

West Germany. I understand the cost to Germany to be in excess of $100m. NASA will, as usual in these projects, provide the launch vehicles, in this case two Titan Centaurs, at a cost to us in the neighborhood of $55m. Seven German experiments will be on board, accompanied by three from the US, Italy and Australia, all calculated to advance our knowledge of the sun and the interplanetary medium, the basic elements of earth's environment in space.

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Some means of reasonable cost-sharing will be sought in the not distant future. For this reason, we have written into recent agreements for ERTS ground stations an option which will permit us, sometime after the next ERTS satellite, "B", has been operating for at least a year, to introduce a fee for access to the satellite. Assuming that sufficient ground stations are in being around the world at that time, the cost per station should not be onerous, nor indeed do we wish to discourage participation. On the contrary, we should like to see more participation -- but soundly based on cooperative cost-sharing, defraying in some part costs which the U. S. so far bears alone.

ASTP AND SPACELAB

Let me turn now to the latest and largest cooperative space projects undertaken to date. As many of you know, we are now preparing to carry out, in July 1975, the first international manned space mission. The flight will mark the culmination of the Apollo-Soyuz Test Project in which a universal docking system suitable for future spacecraft will be tested and evaluated, using U. S. and Soviet vehicles. This international docking system, jointly designed and independently developed by Soviet and U. S. engineers, not only opens the way to mutual assistance in space,

but it could also represent a keystone to expanded cooperation with the Soviet Union and -- when the Spacelab becomes available -- with both the Soviet Union and Europe on the same mission.

The demanding cooperative character of the Apollo-Soyuz Test Project should not be underestimated. Between 50 and 100 technicians on each side have been meeting alternately in Moscow and Houston to work out the compatible docking mechanism and the complex rendezvous and docking operation. Teams of astronauts and cosmonauts have been working closely together for extended periods to familiarize each other with the spacecraft and crew operations so that there will be no surprises in space. Hardware tests have been conducted both in the U. S. and the Soviet Union.

The ASTP agreement stems from a first step in late 1970. The most careful evaluation, definition and guidelining was required before Heads of State could commit to a test flight at the 1972 Summit meeting. Our cost will be roughly $250m. Soviet costs may be even greater since they have already flown two unmanned tests of the planned spacecraft configuration, and also expect to carry out a manned test of this same configuration. Moreover, the Soviet Union is readying two spacecraft and two

launch vehicles to our one -- in order to have a double chance to bring the mission off on schedule. The truly remarkable effort demanded by this major program should improve understanding, introduce a healthy realism in personal relationships, and pave the way for any future programs the two governments want to do together in space.

The most significant cooperative effort of which we are aware is the joint development of a new space facility. Last September, after four years of discussion and negotiation, the European Space Research Organization, ESRO, acting on behalf of nine member states, agreed to design and develop the Spacelab as a key element of the U. S. Space Transportation System. Spacelab will involve a European expenditure amounting to a current dollar equivalent well in excess of $400m.

Mr. Gibson, the Acting Director-General of ESRO, will no doubt tell you something of Spacelab from the European point of view. Looking at it from the U. S. point of view, Spacelab will consist of modules providing a pressurized shirt-sleeve lab plus pallets or platforms external to the lab to accommodate instruments such as a telescope which require direct viewing or exposure in space and need no atmosphere. The modules will fly attached to the reusable U. S. shuttle orbiter in its cargo bay.

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Spacelab will give us a facility for realizing a substantial part of the promise of the shuttle system -- the introduction of a new, more economic base for a wider range of space activities. The Spacelab will make it possible to experiment on short notice, with quick turn-around time, to "plug in" to standard lab facilities with a minimum of special design for the space environment, and with a marked easing of the old constraints on weight and volume which so escalated the cost of space research in the conventional mode.

Some of the purposes to which Spacelab will be put are the following:

- Spacelab teams may pioneer in materials processing in space, developing superior crystals or bearings in zero-g.

- o Work can be done on technologies for collecting and relaying solar energy for use on Earth.
- o Vaccines and medical plasmas will be processed which could not be matched on earth.
- o Earth-looking observation programs will be carried on to test new sensors or new applications.
- o We will study the interaction of the Sun and the Upper Atmosphere as the primary forces shaping our weather.
- o We will have an unparalleled platform for the use of large telescopes above the obscuring effects of the Earth's atmosphere.

What were the considerations which produced the cooperative development of so significant an element of our own future space transportation system? First, there was in this country the desire to enlist substantial foreign participation in a major development program -- something which had not materialized in the otherwise broad international activity which NASA has conducted.

Second, I believe that this objective was credible in Europe because of the high success of previous cooperative space ventures with ESRO and its individual member countries.

Third, an association in a joint enterprise with NASA was itself regarded as an attractive goal in Europe because of NASA's record in the Apollo and other programs.

Fourth, Europe had established its own capability for such a project through a decade of successful satellite projects and the effective management capability demonstrated by ESRO.

Fifth, participation in the development of the reusable shuttle system was specifically attractive because it could clearly represent the way space business would be carried on in the future.

Sixth and last, a viable agreement of mutual interest was developed. That agreement preserved the management integrity of the overall program in which the U. S. was of course the major investor, but it provided for real responsibility on the part of Europe for an element of the whole which was as separable as such an element can be. The agreement assured NASA of a substantial contribution to a U. S. program. It also assured Europe that its R&D investment would be recognized through U. S. commitments to purchase any additional Spacelabs of the same basic capability from Europe.

Perhaps these considerations provide a fairly useful listing of guidelines for successful collaboration in any area. Certainly, we hope they prove sufficient for success in the case of Spacelab.

Of course, we want to look even beyond Spacelab. The first great opportunities for extended collaboration will undoubtedly come with the use of Spacelab itself. We invited substantial ESRO representation to this past summer's study of the shuttle's use for space applications, and I understand that ESRO is stimulating comparable discussions in Europe regarding such use. While each of us will have many purely national uses of the system, we will undoubtedly want to collaborate in still other uses, and we shall look forward to that.

CONCLUSION

Space cooperation has been far more extensive than the public or even governments generally realize. In fact, we with our collaborators will have invested roughly a billion dollars in joint projects when current agreements run out -- this does not count either ASTP or Spacelab! For us, substantial savings have been involved since we've spent only a quarter of that figure and gained access to meritorious space research and convenient facilities. For our friends, it has been valuable because they have gained access to launch possibilities and to a framework of collaboration which would have cost many, many times as much were they to have operated independently.

The many significant cooperative projects now underway grew from sound national programs and reflect a careful analysis of our common goals. Our joint efforts have not been -- and will not be -- charitable or cosmetic exercises. We and our partners have strong mutual interests in exploring and using space; we can both reduce our costs and increase our benefits by attending to those common interests. Unless our cooperative projects respond to the needs and goals of all participants, however, they will not stand up under the rigorous tests to which every government agency subjects its programs.

We see in space an unlimited opportunity to benefit humanity -- and we are firmly convinced that this unlimited opportunity can be shared by Europe, the United States, and the entire world. It is our intention to encourage mutually beneficial cooperation at every occasion, and it is our belief that through such wide-ranging cooperation, we may contribute substantially to the peace and prosperity we have so long pursued.

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REMARKS OF

DR. JAMES C. FLETCHER, ADMINISTRATOR

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

AT THE

WORLD AEROSPACE CONFERENCE

15 OCTOBER 1974

THE STANFORD COURT

SAN FRANCISCO, CALIFORNIA

INTRODUCTION

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summer's study of the shuttle's use for space applications, and I understand that ESRO is stimulating comparable discussions in Europe regarding such use. While each of us will have many purely national uses of the system, we will undoubtedly want to collaborate in still other uses, and we shall look forward to that.

CONCLUSION

Space cooperation has been far more extensive than the public or even governments generally realize. In fact, we with our collaborators will have invested roughly a billion dollars in joint projects when current agreements run out--this does not count either ASTP or Spacelab! For us, substantial savings have been involved since we've spent only a quarter of that figure and gained access to meritorious space research and convenient facilities. For our friends, it has been valuable because they have gained access to launch possibilities and to a framework of collaboration which would have cost many, many times as much were they to have operated independently.

The many significant cooperative projects now underway grew from sound national programs and reflect a careful analysis of our common goals. Our joint efforts have not been--and will not be--charitable or cosmetic exercises. We and our partners have strong mutual interests in exploring and using space; we can both reduce our costs and increase our benefits by attending to those common interests. Unless our cooperative projects respond to the needs and goals of all participants, however, they will not stand up under the rigorous tests to which every government agency subjects its programs.

We see in space an unlimited opportunity to benefit humanity--and we are firmly convinced that this unlimited opportunity can be shared by Europe, the United States, and the entire world. It is our intention to encourage mutually beneficial cooperation at every occasion, and it is our belief that through such wide-ranging cooperation, we may contribute substantially to the peace and prosperity we have so long pursued.